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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/046,346	10/26/2001	Joseph J. Sumakeris	5000.221	2872

21176 7590 12/12/2003

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EXAMINER

MUNSON, GENE M

ART UNIT PAPER NUMBER

2811

DATE MAILED: 12/12/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/46,346

Applicant(s)

J. SUMAKERIS ET AL

Examiner

G. MUNSON

Group Art Unit

2811

AW

— The MAILING DATE of this communication appears on the cover sheet beneath the correspondence address —

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE THREE MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- ☒ Responsive to communication(s) filed on 13 August 2003
- ☐ This action is **FINAL**.
- ☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

## Disposition of Claims

- ☒ Claim(s) 1-51 is/are pending in the application.
- Of the above claim(s) 46-48 is/are withdrawn from consideration.
- ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- ☐ Claim(s) 1-14, 19-45, 50, 51 is/are rejected.
- ☒ Claim(s) 15-18, 49 is/are objected to.
- ☐ Claim(s) \_\_\_\_\_ are subject to restriction or election requirement

## Application Papers

- ☐ The proposed drawing correction, filed on \_\_\_\_\_ is ☐ approved ☐ disapproved.
- ☐ The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner
- ☐ The specification is objected to by the Examiner.
- ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. § 119 (a)-(d)

- ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119 (a)-(d).
- ☐ All ☐ Some\* ☐ None of the:
  - ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a))

\*Certified copies not received: \_\_\_\_\_

## Attachment(s)

- ☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). 3, 12 1/2
- ☐ Interview Summary, PTO-413
- ☒ Notice of Reference(s) Cited, PTO-892
- ☐ Notice of Informal Patent Application, PTO-152
- ☐ Notice of Draftsperson's Patent Drawing Review, PTO-948
- ☐ Other \_\_\_\_\_

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Claims 46-48 are withdrawn from consideration as being for non-elected species, the election having been made *without* traverse in the response, paper No. 12, filed 13 August 2003.

Applicants are requested to cancel the non-elected claims as part of a complete response to this office action. Note that cancellation of the non-elected claims would not preclude the later filing of a divisional application on the non-elected species (35 U.S.C. 120, 121).

In claim 16, "1x10<sup>19</sup>" is misprinted.

Claims 6, 11, 20, 29-36, 43 and 51 are rejected under 35 U.S.C. 112, first and second paragraphs. In claims 6, 20, 29 and 43, "any portion" appears misdescriptive or not based on an adequate specification, because "stacking faults" would grow in a "portion" which includes layer 33. Claim 11 disagrees with page 15, paragraph [0057].

Claims 24-26, 28 and 42 are rejected under 35 U.S.C. 112, second paragraph. Claim 24 is omitted. In claim 42, the "active" region has no clear antecedent. In claim 28, "that layer" has no clear antecedent.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(c) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has

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fulfilled the requirements of paragraphs (1), (2), and (4) of section 371© of this title before the invention thereof by the applicant for patent.

(f) he did not himself invent the subject matter sought to be patented.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-5, 21-23, 28, 37-41, 44 and 45 are rejected under 35 U.S.C. 102 as unpatentable as shown by acknowledged prior art in this application (Figures 1-3; pages 1-3, 6-12). See Figure 3. The "n-type" region (claims 1, 21) reads on layer 21; the "interface" (claims 5, 21) reads on the interface between layer 21 and ohmic contact 26. A "terminating" layer (claim 37) reads on layer 24 and an inherent sublayer of layer 23, or on layer 22 and an inherent sublayer of layer 21, with an inherent remainder of layer 21 as the "substrate". In claim 44, the "highly doped" layer reads on layer 22, or layer 21. The claims are broad in scope.

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Claims 1-5, 21-23, 27, 28, 37-41 and 44 are rejected under 35 U.S.C. 102 as shown by Suzuki et al, cited by applicants. See Figures 3, 4, columns 8-10, with "p-type" region 31, 50 and "n-type" region 20. The "stacking faults" (claims 5, 21, 44) would be inherent.

Claims 1-5, 21-23, 27, 28, 37-41, 44 and 45 are rejected under 35 U.S.C. 103 over Suzuki et al, as in the above rejection. It would have been obvious to use a thickness of "p-type" region 31 and "n-type" region 20 more than  $2\mu\text{m}$  as suggested by Suzuki et al (columns 8, 10).

Claims 1-5, 7-9, 19, 21-23, 28, 44 and 45 are rejected under 35 U.S.C. 102 as unpatentable as shown by Edmond et al. See Figure 2, columns 9-13, with "n+" region 22, "n-" region 23 and "p" region 24. The "stacking faults" (claims 5, 19, 21, 44) would be inherent.

Claims 1-5, 7-9, 14, 19, 21-23, 28, 44 and 45 are rejected under 35 U.S.C. 103 as unpatentable over Edmond et al. It would have been obvious to use region 22 of Edmond et al (Figure 2) with a thickness between about 10 and 20 microns, as suggested by Edmond et al (column 12), which is greater than the "minority carrier diffusion length". It would have been obvious to choose the "carrier concentration" of a "p-type" region 24 and "n-" region 23 within the ranges suggested by Edmond et al (column 9, layers 13 and 12 correspond to layers 24 and 23 in Figure 2), which would give the claimed ratio in claim 14.

Claims 1, 4, 5, 7, 10-13, 19, 21, 22, 27, 28, 37, 38, 41, 44, 45 and 50 are rejected under 35 U.S.C. 102 as unpatentable as shown by Hermansson, cited by applicants. See Figure 1, column 4, with "p" region 5 and "n-" region 3, 4. The "n+" region reads on an inherent subregion in layer 2 adjacent layer 3, with an inherent remainder of layer 2 as the "substrate". Similarly, the "contact"

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layer (claim 13) reads on an inherent sublayer of layer 5 adjacent anode 6. The "stacking faults" (claims 5, 19, 21, 44) would be inherent.

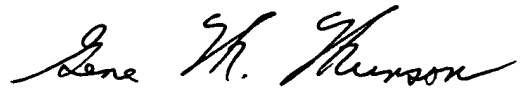
Furukawa et al is cited of interest in showing reduction of stacking faults in silicon carbide.

Claims 15-18 and 49 are objected to as dependent upon rejected claims but would allowable over the art of record if claims if claims 15, 17, 18 and 49 were each put in completed form as independent claims, including all limitations of claims 7, 15; 7, 17; 7, 18; 7, 10, 49.

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12/10/03



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